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ELECTRONIC DESIGN • DEVELOPMENT • MANUFACTURING

BELL INC.
COLUMBUS, OHIO

INSTRUCTIONS AND OPERATING

MANUAL FOR

MODEL CS-6020

MAGNET CHARGER

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MODEL CS-6020

MAGNET CHARGER

SECTION I

General Description

The Model CS-6020 Magnet Charger is a low energy capacitor discharge magnetizer designed for use with materials in the Alnico group. Typical applications are loud speaker magnets, small motor magnets, toy magnets, holding magnets, bias magnets, door latch magnets, meter magnets, some TWT (Traveling Wave Tube) magnets and many other types having a volume of approximately one cubic inch or less. The CS-6020 uses a solid state switch (silicon controlled rectifier) to control the high charging current making it particularly suitable for continuous trouble-free operation in industrial environments.

SECTION II

Specifications

CHARGING ENERGY:	16 Watt seconds.
OPERATING VOLTAGE:	37 Volts at rated line voltage.
MAXIMUM CHARGING CURRENT:	800 Amperes peak.
RECYCLE TIME:	5 Seconds for full recovery.
EXTERNAL TRIGGER:	Contact closure between rear panel binding posts (contract rating-300 mA at 50 V).
POWER REQUIREMENTS:	115 Volts, 50/60 Hz, 30 Watts maximum average power (90 W peak).
DIMENSIONS:	5 3/4" high, 15" wide, 10 3/8" deep.
WEIGHT:	Net 16 lbs., shipping weight 21 lbs.

SECTION III

Operating Instructions

a) Magnetizer:

Operation of the Model CS-6020 Magnetizer is extremely simple from the operator standpoint. The unit must be connected to a 115 V 50/60 Hz line, and an appropriate magnetizing coil attached to the front panel "TO FIXTURE" terminals, after which the unit is ready to operate. Magnetizing can be accomplished by depressing the front panel "PUSH TO CHARGE" switch or by using a remote switch such as a foot peddle or relay closure. The switch or relay contact used should have a 300 mA at 50 V rating or higher. The front panel "CAPACITOR CHARGE" light indicates when the energy storage capacitors have recharged and the unit is ready to recycle. Approximately 5 sec. is required for the energy storage capacitors to reach full charge.

b) Fixture:

A standard general purpose fixture (Model C-601), is available for use with the CS-6020. This fixture consists of a 1" long coil, with a 1" inside diameter opening, mounted vertically on a base block. The C-601 will produce a magnetizing field (H) of 3.6 kOe (kiloersteds).

For specific applications where the C-601 fixture is unsuitable it will be necessary to design special coils. Typical designs for use with the CS-6020 are:

1) COIL: 1 1/2" inside diameter X 1" long wound with 42 turns of number 16 copper wire (heavy Nyclad).

FIELD: 2.4 kOe (kiloersteds)

2) COIL: 1" inside diameter X 1" long wound with 87 turns of number 16 copper wire (heavy Nyclad).

FIELD: 3.6 kOe (kiloersteds)

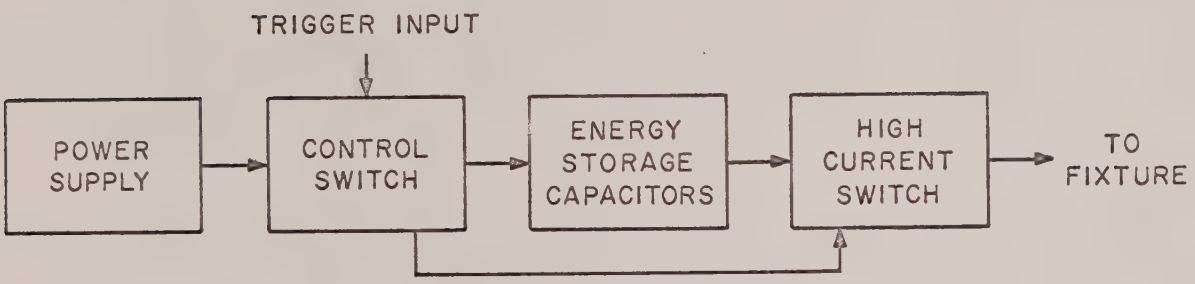
The CS-6020 provides 16 watt-seconds of energy at 37 volts. It can be operated on a continuous basis into a short circuit and will produce a peak current of approximately 800 amperes.

SECTION IV

Theory of Operation

The CS-6020 consists of four basic operating blocks:

1) Power Supply
2) Control Switch
3) Energy Storage Capacitors
4) High Current Switch



The Power Supply converts the ac line voltage to a dc voltage (37 V). The Control Switch connects this dc voltage to the Energy Storage Capacitors allowing them to charge to the supply voltage (37 V) while the High Current Switch remains open. When the Control Switch is triggered, the Power Supply is disconnected from the Energy Storage Capacitors and the High Current Switch is closed. This discharges the stored energy into the fixture coil. After the Energy Storage Capacitors have been discharged, the Control Switch automatically returns to its original position, recharging the Energy Storage Capacitors while holding the High Current Switch open. This completes a cycle and the unit is ready to be retriggered.

SECTION V

Maintenance

The CS-6020 is designed for continuous trouble-free operation and should require very little maintenance. Should trouble occure, check the supply voltage. It should be approximately 37 V when connected to a 115 V line. If this voltage is present, check for proper operation of the Control Switch (relay K1). The most probable cause of trouble is dirty or tarnished relay contacts. This condition can be cured by cleaning the contacts with very fine sandpaper and contact cleaner. In extreme cases, it may be necessary to replace the relay.

SECTION VI

Warranty

F. W. BELL, INC. warrants each instrument of its manufacture to be free from defects in material and workmanship. Our obligation under this warranty is limited to servicing or adjusting any instrument returned to our factory for that purpose, and to replacing any defective parts thereof (excluding electron tubes, batteries, transistors and probe sensing elements, which parts are covered by a standard EIA 90-day warranty). This warranty covers instruments which, within one year after delivery to the original purchaser, shall be returned with transportation charges prepaid by the original purchaser, and which upon examination shall disclose to our satisfaction to be defective. If it is determined that the defect has been caused by misuse or abnormal conditions of operation, repairs will be billed at cost after submitting an estimate to the purchaser.

F. W. BELL, INC. reserves the right to make changes in design at any time without incurring any obligation to install same on units previously purchased.

This warranty is expressly in lieu of all other obligations or liabilities on the part of F. W. BELL, INC. and F. W. BELL, INC. neither assumes nor authorizes any other person to assume for them any other liability in connection with the sales of F. W. BELL, INC. instruments.

DAMAGE IN SHIPMENT

The instrument should be examined and tested as soon as it is received. If it does not operate properly, or is damaged in any way, immediately file a claim with the carrier. The claim agent will provide report forms. A copy of the completed form should be forwarded to us. We will than make the necessary arrangements for repair or replacement. All correspondence concerning this instrument should include model and serial numbers.

SHIPPING INSTRUCTIONS

All shipments of F. W. BELL, INC. instruments should be made, via Railway Express or Motor Freight. Always use the original shipping carton and inserts, if possible, or pack the instrument in a sturdy container and surround the entire instrument with two or three inches of excelsior or similar shock-absorbing material.

SECTION VII

Parts List

Schematic Reference	Description	Specification	Bell Part No.
C1	Electrolytic Capacitor, can type	1500 µF at 50 WV	CHL-01-003
C2, C3	Electrolytic Capacitor, can type	12,000 µF at 40 WV	CFL-30-12K
F1	Fuse	3A, 3AG slow-blow	QF-08-3A
L1	Bulb	14 V, .1A GE 1813	QL-01-001
T1	Power Transformer	Stancor P6379	LA-1936
D1, D2, D3, D4, D5	Diode	IN4720	JT-IN4720
SCR1	Silicon Controlled Rectifier	2N1792	JT-2N1792
K1	Relay	Potter & Brumfield KA 11 DG (12V)	SQ-01-001
S1	Power Switch	SPST, 6A at 125V	ST-01-002
S2	Push Button Switch	D. P. DT 300 mA at 50 V	SP-01-001
R1	Wire wound resistor	180 ohm, 5W, ±5 %	RH-04-180
R2	Wire wound resistor	15 ohm, 5W, ±10 %	RH-02-15
R3	Wire wound resistor	5 ohm, 25W, ±5 %	RH-03-5
R4	Wire wound resistor	250 ohm, 5W, ±10 %	RH-02-250
R5	Wire wound resistor	470 ohm, 2W, ±10%	RL-14-470

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